May 7, 1998

DRILLING PROCEDURES
FOR
KARST PRONE AREAS

1. Introduction

In accordance with IC 14-37, the Division of Oil and Gas is responsible for regulating the drilling, casing, operating, plugging, and abandoning of wells and any related fluid storage to prevent waste, fresh water pollution, blowouts, cavings, seepages, fires, and unreasonably detrimental effects upon fish, wildlife, and botanical resources. Accordingly, the division has developed the following policy statement to clarify the requirements and recommendations for drilling in areas that are prone to the development of features such as caves and sinkholes:

2. Purpose

The purpose of this nonrule policy document is to provide supplemental protection to karst areas of the state during drilling operations regulated by the division under IC 14-37.

3. Nonrule Policy

1. The Department of Natural Resources shall classify caves that will be excluded from drilling and production activities. The procedure for establishing excluded caves shall be developed separately from this document.
2. No wells shall be drilled within the boundaries of any cave classified as excluded by the department. Boundaries shall be defined as the area within the known cave limits plus a reasonable buffer zone around the known cave limits. Establishment of actual limits and buffer zones for excluded caves shall be developed separately from this document.
3. Information regarding the known location of cave entrances for those caves not excluded under the classification system noted in paragraphs 1 and 2 shall be used to notify permit applicants of the existence of caves in the area to be drilled. For purposes of this paragraph the location of known caves shall be limited to those caves identified in public or published works supplied to the Division of Oil and Gas

from which the location of a cave entrance can be determined to be accurate to within a radius of 330 feet from the stated or plotted location.

4. For wells that are drilled the following shall apply:
    - Where possible air drilling should be used
    - If a mud rig is used, drill with water **only** until casing has been set and cemented into the Borden Group for karst developed upon Mississippian aged rocks, or the Maquoketa Group for karst developed upon Devonian and Silurian aged rocks.; after which a mud system may be used to complete the drilling.
    - The use of a tank system to contain drilling fluids is preferred
    - If drilling pits are used they shall be lined with an artificial liner that is impermeable to at least $1x10^{-7}$ md. and is of sufficient strength and tear resistance to prevent a loss of fluid regardless of the substrate on which it is placed.
    - If the proposed well location does not have sufficient unconsolidated material above the bedrock surface to properly excavate a pit the operator shall use a tank system to contain all drilling fluids.
    - All drilling fluids shall be disposed of in the following manner:
        - All filterable fluids shall be injected into an approved Class II well
        - Non filterable bottom liquids shall be either solidified in place using a Class A cement slurry or kiln dust, or removed and disposed of in an approved special waste landfill or removed and placed into a pit authorized for fluid storage by the Division of Oil and Gas
    - Regardless of depth, all surface casing shall be set at least 30 feet into the Borden Group for karst developed upon Mississippian aged rocks, or the Maquoketa Group for karst developed upon Devonian and Silurian aged rocks.
    - Surface casing shall be cemented from setting depth to surface utilizing cement baskets in the string to support the cement column to minimize infiltration into karst features.
    - The operator shall maintain a record of all casing and cementing procedures and materials, and make that record available to the division upon request;
    - The operator shall set intermediate strings of casing through voids using the following procedure:
        - Drill at least 30’ past the void and set casing with a cement basket placed within 20 feet above the void. Cement shall be balanced in for the lower 30 feet of casing and tremie pipe shall be used to place cement from the basket to the surface.
    - All strings of casing that pass through a void or lost circulation zone shall be cemented from casing setting depth back to the lost circulation zone. A basket shall be placed above the most shallow lost circulation zone and if surface circulation is not completed then cement will be placed on the basket with the use of a tremie pipe system back to surface.

      At the request of the division the operator shall run a cement bond log on the production casing back to surface and submit the results of the log to the division.

In the event any casing string cement does not initially reach surface and it is necessary to use a tremie pipe system to place cement on a basket, then the production string of casing must be cemented to surface.

- All lost circulation zones shall be reported in the lithologic record on the Well Completion or Recompletion Report for the well

5. Any person may request an exception to the drilling requirements noted above by submitting a request in writing that specifies the relief sought and includes sufficient information for the division to evaluate the request. The request will be considered at a hearing conducted under 310 IAC 7-1-12.1.
6. The procedures noted above are in addition to any provisions specifically required under 310 IAC 7-1 and 7-1.5.